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ABSTRACT

This paper is based on the view that, although scientists rely on research values such as predictive accuracy and testability, scientific research is still subject to the unscientific values, attitudes, and emotions of the scientists. It is noted that undergraduate students are likely not to think critically about the science they encounter. A class activity is then presented which demonstrates how researchers' values and those of society influence science. In this activity, five women are asked to volunteer to thread a needle, followed by five men who are drafted to perform the same task as a data gathering exercise. It is noted that when the participants are timed, the women always win. Following this exercise, the instructor announces that this was a fine motor skills test which shows that only women should be neurosurgeons; when the class objects, the instructor then allows the class to identify what is wrong with this reasoning. Several issues in biased research are suggested including the problems of: (1) variable labels being assumed to reflect the true quality of the variable; (2) biases in subject selection; (3) problems with volunteer subjects; (4) the exclusion of environmental factors in favor of personal characteristics; (5) avoidance of mass media; and (6) how publicized findings influence public policy. It is recommended that instructors conclude the activity by encouraging students to formulate questions about these topics when reading scientific research. (ABL)

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There's No Such Thing as Value-free Science

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Abstract

Undergraduate students tend to believe that if something is in print it is good research, and if it is good research, it is value-free. This technique pits teams of female volunteers against male draftees on a fine-motor-skills task (needle threading) to illustrate and generate discussion of the ways in which researchers' values, institutional values, and societal values shape science. This technique requires approximately one hour and is appropriate for any discussion of research methods.

There's No Such Thing as Value-free Science

Claiming that science is value-laden is hardly a new insight. According to sources cited by Howard (1985), those involved with the philosophy of science were making this point 30 years ago. The classic goal of science is the search for "truth." Both this goal and the criteria used to evaluate whether a piece of work moves us closer to this goal constitute values of the researcher which are seldom recognized as such. For example, Howard (1985) concludes that theory-appraisal is a sophisticated form of value-judgment: when making their appraisals, individual scientists emphasize different subsets of such research values as predictive accuracy, internal coherence, external consistency, unifying power, fertility, simplicity, and testability.

Although these value-judgments have profound effects on science, if these were the only ways in which values affected the research enterprise, few people would be concerned. Their presence does not make science obviously less "objective." However, the case can be made that scientifically unacceptable values related to the attitudes or emotional responses of individuals also affect the scientific enterprise, and this is a point that needs to be made in the classroom.

Undergraduate students need to be taught to think more critically about information presented to them. In the research domain, in particular, the more "scientific" information seems, the less likely students are to question

any aspect of what they read, whether operational definitions or variable labels, recruitment techniques or funding sources. The assumption is that because scientific research is public, uses operational definitions, etc., it must also be objective and value-free. The purpose of this class activity is to demonstrate and generate discussion of the ways in which researchers' values, institutional values, and societal values shape science.

Methods

Materials Needed

For this exercise you will need a stop watch; a needle with a fairly small eye (and a replacement just in case); a spool of thread; and a pair of scissors, preferably ones with very small handles, such as those in travel sewing kits.

Procedures

Open the class with a statement of the effect that data gathering is the heart of the research enterprise, so that in today's class, you will first collect some data to serve as the basis of later discussion. Then ask for five women volunteers who are willing to come to the front of the room and thread a needle. You may have to cajole a little. When the team is lined up, put the scissors, a needle, and a length of thread on the desk. Explain that they will each have one trial, during which they are to pick up the needle and thread, thread the needle, tie a knot in the end of the thread, cut the knot off again, take out the thread, and replace the needle and thread on the

desk. Time each trial. Announce each woman's time and have a woman student record the times and compute the group average at the end. Replenish the length of thread between trials. Say something like, "Good. You're doing fine," after each trial.

After the women are finished, draft five men for the second team. Avoid the really shy ones, of course, but try for the big athletes. As they line up, you might want to indicate that you know they probably won't do very well, but that you appreciate their cooperation, and just try their best. Proceed as for the women, except make teasing or consoling statement after each trial.

The women always win. Announce that this was a test of fine motor aptitude, that women are clearly superior and that, therefore, only women should be allowed to be neurosurgeons. When the class objects, quickly list on the board all the things they identify as wrong with this "study," then go back and relate those specific objections to the following general points. You will have to fill in some gaps, of course.

Points of Discussion

Ways in Which the Researchers' Values Affect Research

Researchers' values affect every aspect of the research enterprise, beginning with the choice of topics to be studied. A specific example of this could be the emphasis on negative outcomes in single-parent family research (Hetherington, Camara & Featherman, 1983). As Caplan and Nelson point out, "Why do we constantly study the poor rather than the nonpoor in order to understand the origins of poverty? Why do we study nonachievement among minority group members as undesirable behavior, but do not study exaggerated

profit motive among 'successful' businessman (sic) as a form of deviance? Why do we study the use of marijuana as a 'drug problem,' but not Federal government involvement in the drugging of 'minimal brain dysfunction' (MBD) children in our grammar schools?" (1973, p. 207). What might be the values of a researcher who would choose the topic of the class demonstration for study? Under what circumstances are students most likely to recognize the role of values in topic selection?

Both the conceptual and operational definitions of variables are determined by researcher values and are related to each other. For example, you can compare the classic definition of need for achievement as a unitary motive to do well, which was operationalized by scores on the projective TAT, with the Spence and Helmreich definition which emphasizes performance evaluation and is measured by mastery, work, and competitiveness scores on the objective Work and Family Orientation Questionnaire (Spence and Helmreich, 1983). What were the conceptual and operational definitions used in the class demonstration? The point should be stressed that the operational definition measures only limited aspects of the conceptual definition, but is frequently discussed as though it captures, embodies, or represents the entire concept.

There is often a tendency to assume that the variable label is a reflection of some intrinsic quality of the variable itself. In fact, variable labels are often arbitrary, and have connotations which reflect the values of the researcher. For example, ask students for a show of hands for whether they would rather be field independent or field dependent then ask whether they would rather be perceptually restricted or perceptually inclusive. Discuss the emotionally loaded connotations of the two sets of

variable labels which would be equally applicable to the phenomenon. You might also wish to point out that field dependent people do excel in several skill areas (Stang, 1981).

The student reader of a research report seldom realizes that the researchers' values have shaped the research methodology, the analysis of data, and the choice of demographic variables selected for examination. The case can be made for participatory research patterns (Kelman, 1972) and for increased flexibility in research design in general (Schneider, 1974).

The values of the researcher affect the selection of subjects—e.g., the strong historical bias excluding women, old people, and the impoverished from the population samples in stressful life events research (Makosky, 1980). Kelman (1972) pointed out that much research deals with college students in subject pools, military recruits, children, those on welfare, or institutionalized problem populations, which creates a power deficiency for the respondents. This situation creates "bad science": when research is conducted from the perspective of the researcher only, without trying to take the perspective of the disadvantaged groups who are often the object of study, the research will range from being irrelevant to being detrimental to the interests of the groups studied. In addition, you might wish to mention the characteristics of volunteer subjects (Rosenthal and Rosnow, 1975).

One of the most powerful ways in which researchers' values affect science is through the interpretation of data. Caplan & Nelson (1973) discuss the fact that research relating to social problems exhibits a causal attribution bias, favoring explanations that focus on the personal characteristics of those who have the problem to the exclusion of environmental factors. In

addition to the general case of "blaming the victim," a specific research example would be values inherent in the assumption or inference that it's bad that boys from father absent homes are less masculine than boys from father present homes (Hetherington, et al., 1983).

With two days on this topic, it is also possible to go into ways in which the researchers' attitudes, values and/or personal characteristics might affect the actual outcome of the research, as in the cases of the self-fulfilling prophesy, and subject/experimenter interaction effects. What aspects of your behavior might have affected the student's performance?

Finally, the researchers' values determine where the work is submitted for publication and/or how the information is disseminated. Many researchers avoid the mass media. Prestige in the field is more likely to accrue to those who write for specialists in the immediate area of research. Those who want to have the greatest possible effect on the public at large (and/or to make money) will write for the "drugstore psychology" market of paperbacks. Intermediate between these extremes would be interdisciplinary writing and writing for the educated public.

Ways in Which Institutional Values Shape Science

One issue is that institutional values, as represented by decision-making groups/individuals, determine what gets funding and/or other types of support. A second issue is that not all types of research will advance one's career—e.g., scholarly work on transpersonal psychology in very traditional departments.

Ways in Which Societal Values Shape Science

These effects on the research enterprise are less direct than those mentioned earlier. Although societal values do in fact influence both the researcher and social institutions (e.g., Spence, 1983), the most readily separable effects are in what happens to the findings once the research is complete: which findings get publicity; which findings are believed; which findings have an impact on public policy. For example, Caplan and Nelson (1973) point out several outcomes of the person-blame interpretations of social problems that society might construe as advantageous: these interpretations free the government and other social institutions of blame for the problem, and therefore of responsibility for the solution; they make it acceptable to focus on changing the person rather than changing the system; they create helping roles for large numbers of educated non-needy people; and they reinforce generally held beliefs about one's control over his/her fate, thus justifying public complacency about people who have problems.

Conclusion

Typically, individual, institutional, and societal values work in consonance in shaping scientific "truth." For example, reviewing the research on human sex differences over the preceding hundred years, Shields (1975) found that rather than correcting or remedying biases at a particular point in time, the research more often documented and supported these biases and the beliefs and values of the period. The discussion of the exercise is concluded

with a series of questions for students to keep in mind when reading research: (1) Does the research topic relate to fundamental characteristics or processes common to the entire population? (2) Should the findings be specifically limited to a subgroup of people? (3) If differences of sex, race, age or social class were expected, why were they expected? (4) Should the sources of group differences be studies? (5) What alternative interpretations of the data are possible?

Given all the constraints on the objectivity of research evidence, we should "...view the findings of research investigations as demonstrating not what necessarily occurs in the world, but what is possible if human beings were considered from a particular perspective" (Howard, 1985, p. 261).

This technique can be used as the basis for a discussion of research issues in any class. If it is a laboratory or research methods class, you might want to structure an additional assignment around the actual critique of a research report.

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